



## A NEW SPECIES OF *TUPINAMBIS* DAUDIN, 1803 FROM SOUTHEASTERN BRAZIL (SQUAMATA, TEIIDAE)<sup>(1)</sup>

(With 5 figures)

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**ABSTRACT:** A new lizard of the genus *Tupinambis* (Teiidae) is described based on specimens from Usina Hidrelétrica Três Irmãos, at lower Tietê river, between the municipalities of Araçatuba and Pereira Barreto (20°35'-20°45'S and 50°15'-51°20'W), State of São Paulo, Brazil. The specimens were obtained during fauna rescue to fill up the dam. *Tupinambis palustris* sp.nov. is mainly characterized by its ground color on dorsum, black intervened by small gray spots; black spots scattered on the gular surface and neck; large black spots scattered on belly; everted hemipenis shallowly forked with a well defined groove and two large *petalas* on each crown horn distally, larger than in *T. teguixin*, the closely related. In color, the new species also differs from other *Tupinambis* species of *T. merianae* group and *T. teguixin* by the absence of transverse banded pattern on back. It differs from *T. quadrilineatus* by the absence of whitish-yellow longitudinal narrow stripes on flanks, and from *T. longilineus* by the absence of a wide black band on flanks.

**Key words:** Squamata, Teiidae, *Tupinambis palustris* sp.nov., taxonomy.

**RESUMO:** Nova espécie de *Tupinambis* Daudin, 1803 do Sudeste do Brasil (Squamata, Teiidae).

Uma nova espécie de *Tupinambis* é descrita com base em exemplares provenientes da Usina Hidrelétrica Três Irmãos, situada no baixo rio Tietê, entre os municípios de Araçatuba e Pereira Barreto (20°35'-20°45'S; 50°15'-51°20'W), no noroeste do Estado de São Paulo, Brasil. Os espécimes foram coletados nas matas de galeria durante a operação de resgate de fauna, quando do enchimento da represa. *Tupinambis palustris* sp.nov. é caracterizado principalmente pelo padrão de coloração dorsal. O hemipênis evertido apresenta sulco profundo e duas grandes *petala* no ápice de cada ramo, maiores que aquelas em *T. teguixin*. Quanto à coloração, *T. palustris* sp.nov. difere de *T. teguixin* e das espécies do grupo *merianae* pela ausência de bandas transversais no dorso. Difere de *T. quadrilineatus* e *T. longilineus*, respectivamente, pela ausência de estreitas listras longitudinais amarelo-esbranquiçadas e pela ausência de larga banda preta ao longo dos flancos.

**Palavras-chave:** Squamata, Teiidae, *Tupinambis palustris* sp.nov., taxonomia.

### INTRODUCTION

The genus *Tupinambis* Daudin, 1803 is widely distributed throughout South America, east of the Andes. PETERS & DONOSO-BARROS (1970) listed four species in the genus. Ever since, a new species, *T. longilineus*, was described by ÁVILA-PIRES (1995), based on a specimen from the boundary between the Amazon Rainforest and the *cerrado* at northwestern Brazil. Two years later, *T. quadrilineatus* Manzani & Abe, 1997, was recognized as a new species with large distribution throughout Central Brazil. Although VANZOLINI (1996) stated that there was no sympatry between species of *Tupinambis*, ABE, PESANTES & MANZANI (1992) reported sympatric occurrence of *T. merianae* (Duméril &

Bribon, 1839), *T. duseni* Lönnberg & Andersson, 1910, and *T. teguixin* (Linnaeus, 1758) (the latter species is now recognized as *T. quadrilineatus*) in the Municipality of Baliza, State of Goiás, in Central Brazil.

This data suggest a rather complex taxonomic and ecological relationships among the species of the genus.

In 1990, a large swampy area at lower Tietê River, in the State of São Paulo, southeastern Brazil, was flooded during the filling of Três Irmãos hydroelectric power plant. During the fauna rescue, some specimens of *Tupinambis* were collected and identified as *T. merianae* and *T. nigropunctatus* Spix, 1825 (see MANZANI & ABE, 1992). Those specimens first identified as

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*T. nigropunctatus* (= *T. teguixin*) are now recognized as a new species, and herein described.

#### MATERIAL AND METHODS

The holotype and six paratypes were collected in 1990 at lower Tietê River, between the municipalities of Araçatuba and Pereira Barreto (22°35'S, 50°15'W to 20°45'S, 51°20'W), at altitudes between 280 and 350m, State of São Paulo, Brazil. We performed meristic and morphometric analyses on seven specimens preserved in 70% ethanol, after fixation in 10% formalin. Meristic characters were always counted on both sides of the body (except for lamellae on finger and toe, only counted on right side), and are: femoral pores; preanal pores; transverse rows of ventrals (counted along the midline, from gular fold to anterior margin of hind limbs); transverse rows of dorsals (counted along a middorsal line, from nape to posterior level of base of thigh); ventrals across midbody (counted at level of 19<sup>th</sup> transverse series); scales around midbody (counted at level of 19<sup>th</sup> transverse series); subdigital lamellae under fourth finger and subdigital lamellae under fourth toe (counted only on the right side); supraocular scales; supralabial scales ("which end posteriorly very abruptly, usually followed by much smaller scales"; see PETERS, 1964); infralabial scales (posterior boundary defined as the last scale completely covered by last upper labial; see PETERS, 1964); loreals; supratemporals. Measurements (taken in millimeters) were snout-vent length (SVL) and tail length (TL). Color in preservative and the characters mentioned above were recorded for the type-series and compared with those of two paratypes and the holotype of *T. quadrilineatus*, seven specimens of *T. meriana*, and one specimen of *T. teguixin* (all from the Museu de História Natural, Universidade Estadual de Campinas, São Paulo, Brazil). Data from the literature for comparison with *T. longilineus*, *T. duseni*, and *T. rufescens* were taken from ÁVILA-PIRES (1995) and COLLI, PÉRES JR. & CUNHA (1998), LÖNNBERG & ANDERSSON (1910), BOULENGER (1885), and PRESCH (1973), respectively. The type-series of the new species was deposited in the Museu de História Natural, Universidade Estadual de Campinas, Brazil (ZUEC) and in the Museu Nacional, Rio de Janeiro, Brazil (MNRJ).

Hereby we consider *T. duseni* Lönnberg & Andersson, 1910 as a valid species, based on the comparison of the original description with specimens from Baliza, State of Goiás (ZUEC 2510; MNRJ 9341), Brasília, Distrito Federal (ZUEC 2509), and Reserva de Emas, State of Goiás (ZUEC 1903). The specimens from these localities agree in pholidosis and body proportions to those described by LÖNNBERG & ANDERSSON (1910). The remarkable features which distinguish *T. duseni* from other species of *Tupinambis* are the large size of nuchals and relatively short legs and toes.

We followed the terminology of general usage in herpetology for measurements, scalation, and additional traits (*e.g.*, PETERS, 1964; PETERS & DONOSO-BARROS, 1970; PRESCH, 1973; ÁVILA-PIRES, 1995; VANZOLINI, RAMOS-COSTA & VITT, 1980; MANZANI & ABE, 1997; COLLI, PÉRES JR. & CUNHA, 1998; ROCHA *et al.*, 2000).

#### *Tupinambis palustris* sp. nov. (Figs. 1-5)

Holotype – BRAZIL - SÃO PAULO: along the UHE Três Irmãos hydroelectric power plant located at lower Tietê River, 28km above its confluence with Paraná River, ZUEC 2078 (Fig. 1), adult ♂ 324mm SVL, 612mm TL, collected by the animal rescue group from CESP (Companhia Energética de São Paulo), in 1990.

Paratypes – All collected at the same locality and year of the holotype, juvenile ♀ (ZUEC 2081), 211mm SVL, 431mm TL; juvenile ♀ (ZUEC 2080), 241mm SVL, 481mm TL; adult ♀ (ZUEC 2501), 280mm SVL, 390mm TL (incomplete); adult ♂ (ZUEC 2500), 310mm SVL, 450mm TL (incomplete); adult ♂ (MNRJ 9008), 305mm SVL, 515mm TL (incomplete); adult ♀ (MNRJ 9009), 287mm SVL, 492mm TL (incomplete).

Diagnosis – *Tupinambis* characterized by: a moderately blunt head, body approximately cylindrical; one large loreal scale; head and dorsum dark brown in preservative, with a spattering of small gray blotches on dorsum; flanks lacking longitudinal bands or stripes; black spots scattered on gular surface; neck cream ventrally; belly cream with scattered black spots; ventral surface of tail cream, spotless from the first transversal row of scales to 16<sup>th</sup>; everted hemipenis shallowly forked, with well defined groove and distally two large *petala* on each crown horn.

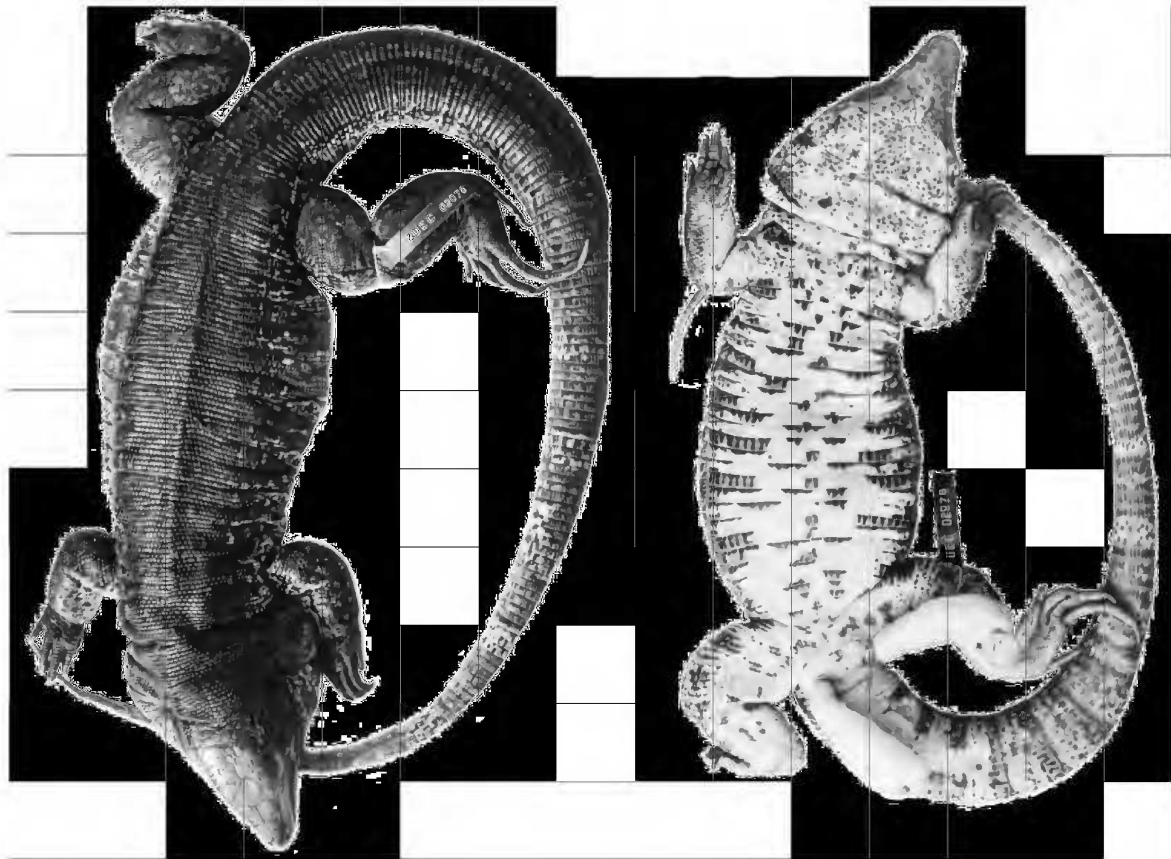


Fig.1- Dorsal and ventral aspects of *Tupinambis palustris* sp.nov. ♂ (holotype, ZUEC 2078, 324mm SVL).

Comparisons with other species (color in preservative) – *Tupinambis palustris* sp.nov. differs from all species of the genus by its dark brown dorsal ground color on body intervened by small gray spots, and by the presence of black spots on neck ventrally and on gular region. From *T. duseni*, *T. merianae*, *T. teguixin*, and *T. rufescens* it differs by the absence of distinct transverse bands across back and flanks. From *T. longilineus* and *T. quadrilineatus* it differs by the absence respectively of a wide black band and 2-3 (mostly 2) longitudinal whitish-yellow stripes on the flanks. *Tupinambis palustris* sp.nov. also differs from *T. teguixin*, the most similar species, by having the *petala* wider (see SAVAGE, 1997) at the distal region of the hemipenis.

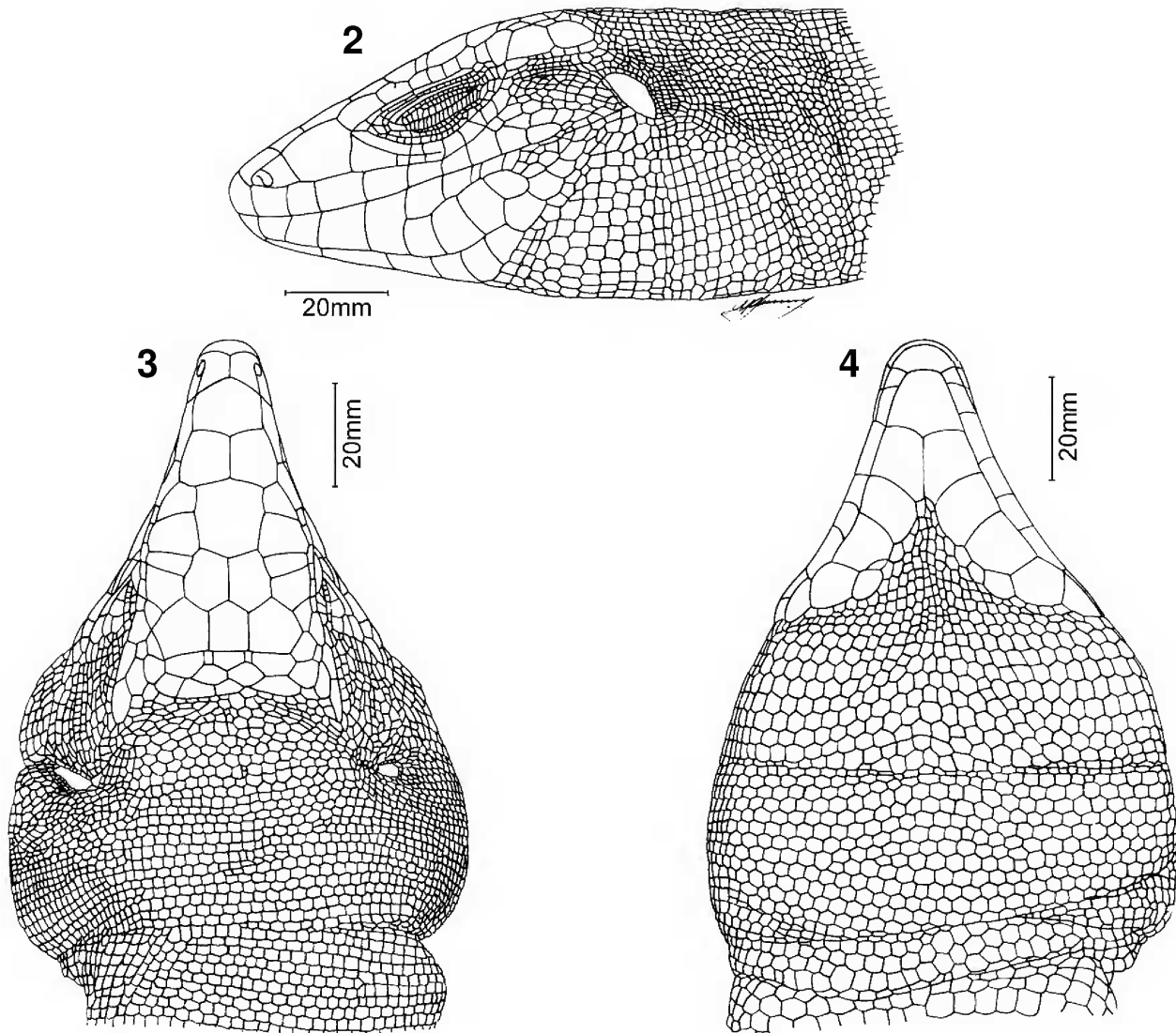
Description of the holotype – Gular region swollen; neck longer than head, which is slightly obtuse (Fig.2). Body and limbs robust. Rostral pentagonal, separated from frontonasal by upper nasals (Fig.3). Nasal divided, nostril large in anterior region of lower nasal. Upper nasals in contact middorsally. Frontonasal hexagonal. One pair of prefrontals irregularly hexagonal. Frontal slightly longer than wide, heptagonal, irregular,

with anterior convex edge. One pair of frontoparietals irregularly heptagonal, touching laterally the second, third, and fourth supraoculars. Interparietal pentagonal. One parietal on each side, pentagonal, wider than longer, remarkably wider than interparietal. Three occipitals touching parietals and interparietal, separated from each other by a small scale. One distinct sulcus dorsally joins the ears. Four supraoculars, the second larger than others; on each side a small triangular shield posterior to the fourth supraocular may be considered as a fifth supraocular. Supraciliaries in direct contact with supraoculars, seven oblong on left side, six on right side; on each side, the first elongate, the second largest; the rest of the supraciliaries quadrangular. One large loreal in contact with lower nasal, frontonasal, prefrontal, first supraciliary, frenocular, and second and third supralabials. One large, keeled frenocular on each side; the left with division process on lower edge touching the fourth supralabial. Six suboculars on each side; the second on right side and third on left side below center of eye and touching the sixth supralabial. Eight supralabials on each side,



the sixth below center of eye. One remarkable groove from labial commissure to lower ear edge. Six infralabials on each side, the sixth below center of eye and followed to labial commissure by small scales. Ten small temporal polygonal scales, juxtaposed, smooth (counted between anterior border of ear and posterior edge of eye); three supratemporals larger than temporals. Temporal region with six oblong shields larger than lower adjacent temporals. Tympanum distinct, oval. Mental trapezoid with convex anterior edge. Postmental single, roughly pentagonal, with round anterior edge contacting first and second infralabials on right side, first, second and third on left side (Fig.4). Nine pairs of chinshields in divergent rows, anteriormost pair

in contact medially, the others decrease in size progressively. Between chinshields, small, rectangular to hexagonal scales prevent the contact among them. Posteriorly to third right infralabial and fourth left, a row of large scales increasing in size posteriorly separates chinshields from infralabials. Gular region with two distinct folds separated by eleven transverse rows of scales. Dorsal and lateral surface of neck with smooth, oblong, convex scales in regular transverse rows. Dorsum and flanks with similar scales, round, convex, smooth; 122 dorsal scales along a middorsal line from nape to posterior margin of hind limbs; 119 scales around midbody. On flanks, 4-5 transverse rows of scales converge ventrally and interdigitate with similar transverse



*Tupinambis palustris* sp.nov. (holotype, ZUEC 2078, 324mm SVL): fig.2- lateral view of head; fig.3- dorsal view of head; fig.4- ventral view of head.

rows of scales which converge dorsally. Ventrals rectangular (except for anterior rows), oblong, rounded, slightly imbricate, in 36 transverse series (between gular fold and the level of the inguinal fold); 22 scales at the 19<sup>th</sup> transverse row (triangular groups of scales at the sides not included). Five femoral pores on right side, four on left side; four preanal pores on each side. Preanal plate with five transverse rows of shields (widest on third and fourth rows; Fig.5). Tail with oblong scales, smooth dorsally from base to 42<sup>nd</sup> transverse row of scales, and ventrally from base to 20<sup>th</sup> transverse row of scales; distal scales keeled and slightly imbricate, with posterior margin convex on ventral surface; dorsolateral dyads of row scales adjoin forming a single row on the paraventral surface. Dyads separated from each other by a single row of scales. Anterior surface of forelimbs with rows of wide, smooth, quadrangular, and juxtaposed scales. Scales on dorsal aspect of hindlimbs granular; anterior aspect of thighs with large, smooth, and quadrangular scales, in oblique rows; ventral aspect with small, squared scales. Tibia ventrally with smooth scales rows three times larger than scales of ventral surface of thigh. A prominent fold on knees. Lamellae under fingers smooth, single or submedially divided; 18 lamellae under fourth right finger, 30 under fourth right toe. Proximal inner lamellae under fourth toe on each side forming a prominent serriform ornamentation.

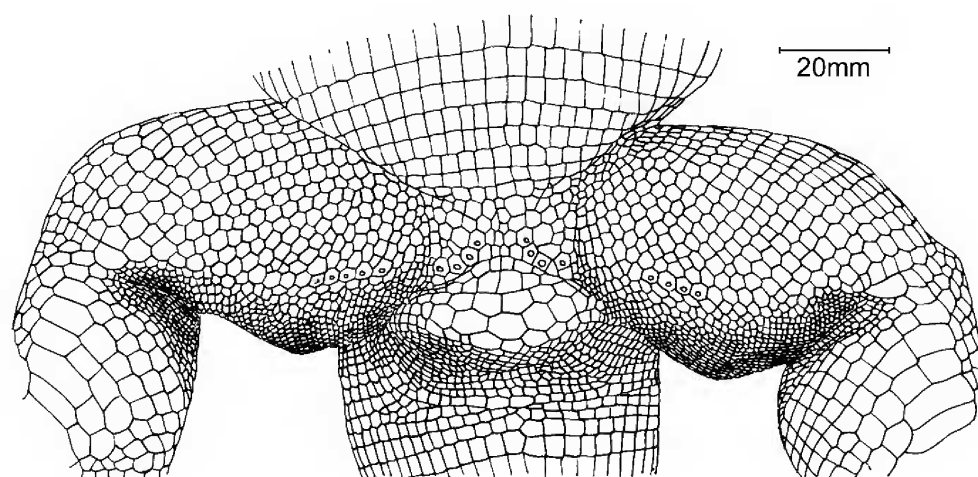
In preservative, color on dorsal surface of head, brown with black spots; ground color of dorsum predominantly dark brown with small gray spots.

Dorsal surface of tail similar to dorsum on its proximal half, distally with ill-defined transverse tan and black bands. Ventral surface of tail, from base to 18<sup>th</sup> row, cream-color and gray; distal segment with ill-defined tan and dark bands to distal level of the second third part of it; marbled appearance on distal third part of ventral surface, cream and tan-colored with two tan bands. Flanks dark brown with light gray spots. Belly, chest, and thighs cream-colored with scattered large dark gray spots. Under forelimbs, cream-colored with small gray spots. Cream-colored anal plate with a large gray spot in center.

Color in life – Dorsal surface of head chocolate-brown with black spots, iris caramel-colored, dorsum chocolate-brown with scattered irregular, small, yellow spots. The description was based on live specimens, color photograph of one topotype, and a Video Cassete (VHS) recorded from two captive males and two females, in courtship and mating, in May 1992 by L.H.Florindo.

Variation – Data on meristic characters for the type series of *T. palustris* sp.nov. are summarized in table 1. There are no sexual or ontogenetic differences in color among individuals of type series, except for the conspicuous light bands around posterior half of tail in juveniles, tenuous in adults. The jaw muscles are developed in adult males, but not as conspicuous as in *T. merianae*.

Habitat and habits – *Tupinambis palustris* sp.nov. was found in the wetlands locally known as *varjão*, often surrounded by gallery forest, along Tietê River (see PINDER, 1996). *Tupinambis*



*Tupinambis palustris* sp.nov. (holotype, ZUEC 2078, 324mm SVL): fig.5- preanal plate.

TABLE 1

Meristic characters for *Tupinambis palustris* sp.nov. (*T.p.sp.nov.*), compared to *T. duseni* (*T.d.*), *T. longilineus* (*T.l.*), *T. merianae* (*T.m.*), *T. quadrilineatus* (*T.q.*), *T. rufescens* (*T.r.*), and *T. teguixin* (*T.t.*)

Characters	<i>T.p.sp.nov.</i>	<i>T.d.</i>	<i>T.l.</i>	<i>T.m.</i>	<i>T.q.</i>	<i>T.r.</i>	<i>T.t.</i> *
Scales around midbody	112-119	*	93 <sup>a</sup> ; 90-98 <sup>c</sup>	133-172 <sup>b</sup> ; 142-178 <sup>c</sup>	112-118 <sup>b</sup> ; 94-115 <sup>c</sup>	*	94-122 <sup>a</sup>
Transverse dorsal rows	111-122	77-89 <sup>z</sup>	110 <sup>a</sup> ; 110-121 <sup>c</sup>	123-145 <sup>b</sup>	113-130 <sup>b</sup> ; 116-138 <sup>c</sup>	104-134 <sup>f</sup>	102-126 <sup>a</sup>
Transverse ventral rows	35-36	32 <sup>d</sup> ; 34-36 <sup>z</sup>	33 <sup>a</sup> ; 19-23 <sup>c</sup>	34-40 <sup>b</sup> ; <sup>z</sup> ; 35-41 <sup>c</sup>	33-36 <sup>b</sup> ; 20-28 <sup>c</sup>	28-34 <sup>f</sup> ; 32-34 <sup>e</sup>	32-38 <sup>a</sup>
Ventrals in a transverse row (total)	22-25	46 <sup>d</sup> ; 30-36 <sup>z</sup>	20 <sup>a</sup>	30-35 <sup>z</sup> ; (27-36) <sup>c</sup>	24-25 <sup>b</sup> ; 20-28 <sup>c</sup>	30-38 <sup>f</sup> ; 46-50 <sup>e</sup>	21-28 <sup>a</sup>
Femoral pores ( <i>per side</i> )	9-13	17 <sup>d</sup> ; (9-13/10-12) <sup>z</sup>	11 <sup>a</sup>	(17-19/16- 17) <sup>z</sup> ; 12-20 <sup>z</sup>	7-8 <sup>b</sup> ; 1-16 <sup>c</sup>	7-8 <sup>e</sup>	5-8 <sup>a</sup>
Preanal pores ( <i>per side</i> )	2-9	5-7 <sup>z</sup>	4 <sup>a</sup>	5-9 <sup>a</sup> ; 4-6 <sup>z</sup> ; (5/5) <sup>z</sup>	3 <sup>b, c</sup>	*	3-6 <sup>a</sup>
Lamellae under fourth finger ( <i>right side</i> )	16-18	11-14 <sup>z</sup>	19 <sup>a</sup> ; 10-13 <sup>c</sup>	15-21 <sup>b</sup> ; 12-19 <sup>c</sup> ; 13-15 <sup>c</sup>	13-15 <sup>b</sup> ; 12-17 <sup>c</sup>	13-18 <sup>f</sup>	13-18 <sup>a</sup>
Lamellae under fourth toe ( <i>right side</i> )	26-33	21-24 <sup>z</sup>	28-29 <sup>a</sup>	29-38 <sup>b</sup> ; 26-34 <sup>c</sup> ; 27-32 <sup>z</sup>	27-31 <sup>b</sup>	23-32 <sup>f</sup>	29-38 <sup>a</sup>
Supratemporals ( <i>per side</i> )	3-4	5 <sup>d</sup> ; 4 <sup>z</sup>	3 <sup>a</sup>	>5; 4 <sup>z</sup>	4-5 <sup>b</sup>	*	2-4 <sup>a</sup>
Loreals ( <i>per side</i> )	1	2 <sup>b</sup> ; 2 <sup>z</sup>	1 <sup>a</sup> ; <sup>c</sup>	2 <sup>b</sup> ; 2 <sup>z</sup>	1 <sup>b</sup> ; 1 <sup>c</sup>	2 <sup>d</sup>	1 <sup>a</sup> ; <sup>b</sup>
Supraoculars ( <i>per side</i> )	4	4 <sup>d</sup> ; 4 <sup>z</sup>	4 <sup>a</sup>	4 <sup>a</sup> ; 4 <sup>z</sup>	4 <sup>b</sup> ; 4 <sup>c</sup>	*	4 <sup>a</sup>
Supralabials ( <i>per side</i> )	7-9	9 <sup>d</sup> ; 7-8 <sup>z</sup>	*	7-8 <sup>a</sup> ; 7-8 <sup>z</sup>	9 <sup>b</sup>	*	7-9 <sup>a</sup>
Infralabials ( <i>per side</i> )	7	(7-9/6-9) <sup>z</sup>	*	7-10 <sup>a</sup> ; 7-7 <sup>z</sup>	7 <sup>b</sup>	*	6-8 <sup>a</sup>
Max SVL (adult)	324mm	(350-405mm) <sup>z</sup>	(202mm) <sup>a</sup> ; (226mm) <sup>c</sup>	*	(260mm) <sup>b</sup> ; (254mm) <sup>c</sup>	*	(345mm) <sup>c</sup>
N	7	4 <sup>z</sup>	1 <sup>a</sup> ; 3 <sup>c</sup>	13 <sup>a</sup> ; 28 <sup>c</sup> ; 7 <sup>z</sup>	4 <sup>b</sup> ; 17 <sup>c</sup>	e <sup>*</sup> ; f <sup>*</sup>	6 <sup>c</sup> ; 45 <sup>a</sup> ; 1 <sup>b</sup>

Data according to (a) ÁVILA-PIRES (1995); (b) MANZANI & ABE (1997); (c) COLLI, PERES JR. & CUNHA (1998); (d) LÖNNBERG & ANDERSSON (1910); (e) BOULENGER (1885), and (f) PRESCH (1973); (z) specimens preserved in the Museu de História Natural, Universidade Estadual de Campinas (ZUEC); (\*) no data available.



*palustris* sp.nov. was collected along with *T. merianae* specimens with whom it is sympatric, and to some extent, syntopic (ABE, PESANTES & MANZANI, 1992). The new species is a slender form of *Tupinambis*, and in captivity spend long time climbing on trees. Also in captivity, this species was not observed to become dormant during the cold and dry season like *T. merianae*, which spent over four months inactive in a burrow (LOPES & ABE, 1999).

Reproduction – Although sympatric and syntopic, the breeding season differs markedly between *T. merianae* and *T. palustris* sp.nov. While *T. merianae* breeds (courtship and egg laying) from August to November (LOPES & ABE, 1999), in captivity *T. palustris* sp.nov. reproductive activity was recorded in May-July (FLORINDO & ABE, 1992). In *T. merianae* the clutch size varied from 22 to 60 eggs (LOPES & ABE, 1999), while *T. palustris* sp.nov. lays six to eight eggs (FLORINDO & ABE, 1992). In this regard, *T. palustris* sp.nov. resembles *T. teguixin* and *T. quadrilineatus*, both with small clutch size of five eggs (MANZANI & ABE, 1997). Judging from its climbing ability, it is possible that *T. palustris* sp.nov. lays eggs on arboreal termite nests, as reported for *T. teguixin* (BEEBE, 1945).

Distribution – The new species was found around the flooded area of Três Irmãos hydroelectric power plant, between Araçatuba and Pereira Barreto, State of São Paulo. However, *T. palustris* sp.nov. may have a wider distribution along the wetlands of Paraná River and its tributaries. During the filling of Porto Primavera hydroelectric power plant, at Paraná River (22°30'04"S, 52°37'14"W), a specimen of *Tupinambis*, clearly recognizable as *T. palustris* sp.nov. by the color pattern in life, was captured by the animal rescue group, in January 1999. Unfortunately, only a color picture of the specimen was made available to us, since the lizard was released afterwards. *Tupinambis merianae* was also collected in large numbers at the rescue of Porto Primavera dam, according to the animal rescue team.

Etymology – The name *palustris*, inhabitant of swamps, refers to the wetland habitat in which the species was found.

#### ACKNOWLEDGMENTS

We thank Ellen Wang (Universidade Estadual Paulista - Rio Claro), for helpful comments and English revision on an earlier draft of the

manuscript; Jivanildo P. Miranda (Universidade Estadual de Campinas) for English revision of the later version; anonymous referees gave valuable comments on the manuscript; Museu de História Natural, Universidade Estadual de Campinas (ZUEC), for allowing examination of specimens; Companhia Energética de São Paulo (CESP) sent us specimens of *Tupinambis*. Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) provided grants to A.S.Abe (process 30133/80).

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